



Invention Disclosure Form: ID-0485

Version 0.1

Instructions:

- ☐ Fill in all sections of this form.
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Contact Information:

Your Information:

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Short Title: Avoid Missing System Information Change Notifications

Question 1

Who are the people whom you would consider to be inventors for this invention? Please list their names and email addresses, include yourself if you believe you are an inventor:

Gideon Roberts (groberts@rim.net)
Andy Farnsworth (afarnsworth@rim.net)

Question 2

Into which projects and/or products, if any, might the invention be incorporated? Please mark with a check.

- ☐ BlackBerry Enterprise Server
- ☐ BlackBerry Handheld Software
- ☐ BlackBerry Wireless Handheld Mobitex and/or DataTAC
- ☐ BlackBerry Wireless Handheld GPRS
- ☐ BlackBerry Wireless Handheld iDEN
- ☐ BlackBerry Wireless Handheld CDMA
- ☐ BlackBerry Wireless Handheld Edge
- ☒ BlackBerry Wireless Handheld UMTS
- ☐ Relay
- ☐ SDK
- ☐ Other:

Question 3:

Are you aware of any date(s) on which the invention, a product incorporating the invention, or any details relating to the invention may have been or is going to be released outside of RIM? If so, please provide the dates of any such releases.

No

Question 4:

What do you call your invention (long title)?

Avoid Missing System Information Change Notifications From A UMTS Cell

Question 5

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How would you characterize the nature or technical field of the invention? For example, this invention relates to software virus protection for mobile communication devices.

Embedded software for UMTS mobile devices

Question 6

What problem(s) does this invention address? Describe in detail.

When a UMTS cell is selected by a mobile device, the master information block (MIB) is read on the broadcast control channel (BCCH) followed by the appropriate system information blocks (SIBs).

The Paging CHannel (PCH) channel needs to be setup by the mobile device if in Idle, Cell_PCH, or URA_PCH state. Information required to configure the PCH is included in system information block type 5 (SIB5).

If the Universal Terrestrial Radio Access Network (UTRAN) needs to change any of the system information blocks, it must inform the mobile devices (UEs) in the cell. A PAGING TYPE 1 message (with the information element 'BCCH modification info' included) is sent via PCH to UEs in Idle, Cell_PCH, or URA_PCH states. A separate mechanism is used for UEs in Cell_FACH state using the SYSTEM INFORMATION CHANGE INDICATION message sent on the Forward Access Channel (FACH).

There is a problem in that a PAGING TYPE 1 message sent after the cell is selected but before the UE has configured the PCH will be missed. For UEs in Cell_FACH state, a SYSTEM INFORMATION CHANGE INDICATION message sent after the cell is selected but before the UE has configured the FACH will also be missed.

In these cases, the UE will be using incorrect/out-of-date system information blocks. This could cause the UE to be unusable in the current cell or have other undesirable effects.

An additional case is where the PAGING TYPE 1 or SYSTEM INFORMATION CHANGE INDICATION message indicates a system information change will occur at a specific time (up to 41 seconds in the future). Here if the UTRAN sends these messages before the UE selects the cell, the system information change will again be missed by the UE.

Question 7

How does the invention solve the problem(s) identified in question 6? Describe in detail.

Solution 1 (UE only):

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The MIB contains a value tag which is changed if any of the system information blocks have been updated. There are also value tags for each of the system information blocks, so it is possible to determine which ones have changed.

Once the UE has configured the PCH (for UEs in Idle, Cell_PCH and Ura_PCH states) or FACH (UEs in Cell_FACH state), the MIB should be re-read. If the value tag is different to the value tag of the previous MIB (stored when selecting the cell), the updated system information blocks should be acquired. If the value tags are identical, no further action is necessary.

This solution solves the problem for BCCH modification info which indicates an immediate system information change.

However, to solve the problem where a system information change is deferred, the MIB must be re-read continually for the maximum possible deferral period (around 41 seconds).

This solution is likely to have an undesirable impact on UE performance due to the repeated re-reading of the MIB.

Solution 2 (UTRAN only):

The UTRAN should send at least one extra PAGING TYPE 1 / SYSTEM INFORMATION CHANGE INDICATION message to indicate the change. The time period between the transmissions should be the maximum allowable time for the UE to configure the PCH/FACH channel after selecting the cell (100ms seems reasonable). Each UE should then receive at least one of the PAGING TYPE 1 / SYSTEM INFORMATION CHANGE INDICATION messages.

For deferred system information changes, the UTRAN will need to repeat the PAGING TYPE 1 / SYSTEM INFORMATION CHANGE INDICATION messages at regular intervals up to the time the change occurs.

This solution increases the work-load for the UTRAN.

Solution 3 (UE and UTRAN):

This solution is a combination of parts of 1 and 2. Immediately following configuration of PCH or FACH, the MIB is re-read on BCCH to determine if any system information blocks have changed. The updated system information blocks can then be acquired by the UE. This part of the solution accounts for system information changes which occur whilst the UE is configuring PCH / FACH.

For PAGING TYPE 1 / SYSTEM INFORMATION CHANGE INDICATION messages which indicate a deferred time for the system information change, the UTRAN should send second a PAGING TYPE 1 / SYSTEM INFORMATION CHANGE INDICATION message in the radio frame before the SIB actually changes. If the UE missed the first message (because it was not in the current cell or no PCH / FACH was configured at the time), the second will be received and the UE can then acquire the updated system information when it is available.

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Question 8

Are you aware of any existing solutions that attempt to address the problem(s) outlined in question 6, if so please list them and provide a brief summary. Please spend a few minutes to search the web using www.google.com and provide the two most relevant solutions you find. (Note: You can paste specific URLs.)

No relevant solutions found.

Question 9

For each solution listed in question 8, how is your solution different? If no existing solutions were found in answer to question 8, please proceed to question 10. Otherwise, how is this invention different from these existing solutions? Describe in detail.

None found.

Question 10

Are you able to provide any documents that relate to this invention (i.e. design documents, specifications, drawings, sketches, flowcharts, rough ideas, etc)? If so, please attach the file(s) when submitting this document by email to patents@rim.net.

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